Is the PLC Finally Dead?

By Buddy Creef
Vice President, Safety Systems
RTP Corporation

Since its creation in the late 1960's, the death of the PLC has been predicted by both its proponents and its critics. Perhaps the time has come when this general purpose control technology should finally be retired, particularly in the process industries where its limited functionality in many cases prevents its justification.

In the early days, the PLC, or PC as it was known then, was considered a fad that would soon fade from view. As time went on, a number of companies introduced a number of devices that were proclaimed to be the successor to the almost certainly defunct PLC. But, the use of PLC technology continued to expand beyond the automotive industry for which it was created into applications in the process industries.

As the personal computer gained acceptance, a number of companies were created with the intent to convert the world to PC-based control. This movement was so well received that many of the PLC companies even created PC-based versions of their products in anticipation of the day that PLC's would be totally replaced by personal computer based devices. Most of those companies have receded or died and the global PLC market continues to grow.

It is fair to say that for forty years, the PLC has outlasted all the pundits who have, for various reasons, predicted its death. To paraphrase a great American writer, the PLC could say that rumors of its death are greatly exaggerated and have been for many decades.

But the recent acceptance of global safety standards may actually lead to the death of the PLC, especially in the process industries.

Due to the continuous improvement aspects of ISA84 (ne IEC61511), the process industries are finding it necessary to replace PLC's with Safety Instrumented Systems (SIS). As Process Hazard Analyses (PHA's) are updated based on the experience of the specific plant or on the collective experience of the industry, the need to implement Safety Instrumented Functions (SIF's) that weren't previously implemented or identified is forcing users to discard otherwise usable PLC's and replace them with SIS systems.

Replacing the PLC not only means the loss of the investment in the PLC itself but also the loss of the investment in the engineering and construction that went into the original

deployment of the PLC. These combined costs may equal five or more times the original cost of the PLC itself, not counting the downtime that was required to install the original system.

Not only does the user need to discard this investment, he needs to make another similar, and in many cases much larger, investment in the replacement SIS system. And, additional downtime will probably be required in order to remove the PLC and install the SIS system. In many cases, the cost of this downtime might exceed the cost of both the PLC system and the replacement SIS.

Instrument and Control Engineers need to consider that every time a PLC is applied in a process plant that is subject to the requirements of IEC61511, it may need to be replaced with an SIS long before its useful life is over. In effect, the Engineer and the budget approval personnel should consider the possibility that the cost of applying a PLC in a process plant might be two to three times the cost of the initial installation.

Some process plants are finding an answer to this dilemma based on new technologies such as the RTP 3000 Critical Control and Safety System. These advanced systems provide SIL capable controllers at costs that are in line with or only slightly higher than those of PLC's. Since they program in the same IEC61131 languages to which all PLC's are migrating, the cost of implementation is similar to that of a PLC. In fact, advanced instruction sets and ease of use programming tools make them even more functional than traditional PLC's.

Systems like the RTP 3000 can be used for both control and safety and are certified for both uses in the same controller. The user simply designates an individual page of logic as a safety page or a non-safety page and the controller takes care of the rest. SIL-Rated modules need to be used for safety related inputs and outputs and can be used for non-safety as well, but non-interfering modules are available for increased point density and decreased cost. They can even be applied in a simplex or redundant configuration and upgraded with additional redundancy later at little incremental cost of equipment and no incremental configuration.

That being the case, users should consider applying SIL-Rated controllers and I/O in all PLC applications if the application is involved with potentially dangerous.

In addition to the savings above, standardization on such a technology would mean:

- standardization of spare parts
- consistent training of personnel
- better ability to maintain SIS systems since all personnel would be trained on their maintenance

- never having to scrap a logic solver due to changes in PHA's or in experience with processes or equipment.

Some safety purists may object to the above since it MIGHT result in safety functions and Basic Process Control Functions being implemented in the same controller. Implementing safety and control in the same logic solver is discussed in IEC61511 Section 11.2.2.

Section 11.2.2 states:

"Where the SIS is to implement both safety and non-safety function(s) then all of the hardware and software that can negatively affect any SIF under normal and fault conditions shall be treated as part of the SIS and comply with the requirements for the highest SIF."

Since systems like the RTP 3000 were originally designed to meet the requirements of IEC61508, they meet Section 11.2.2.

About RTP

Founded in 1968, RTP Corporation is a developer and manufacturer of high-performance critical control and safety systems. RTP Corporation's products serve applications for both basic process control and safety systems. Markets for RPT's products include Refining, Upstream Oil and Gas, Chemical, Nuclear Power, and Glass Industries. RTP offers a wide range of rugged hardware and a complete suite of software for industrial control solutions that include seamlessly redundant and triplicated systems for mission-critical applications.